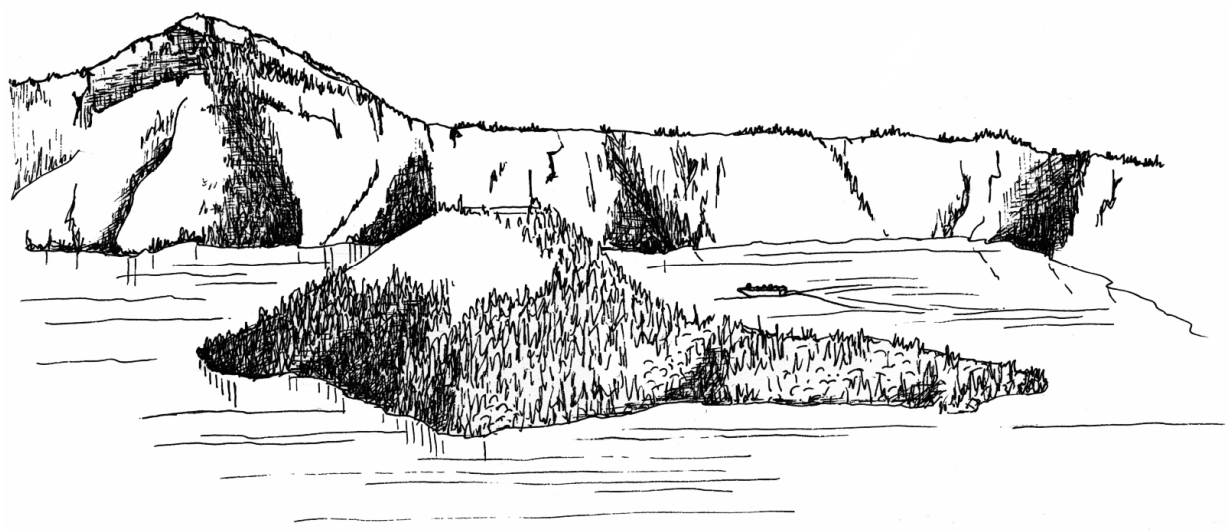
Crater Lake

National Park Service
U.S. Department of the Interior

Crater Lake National Park

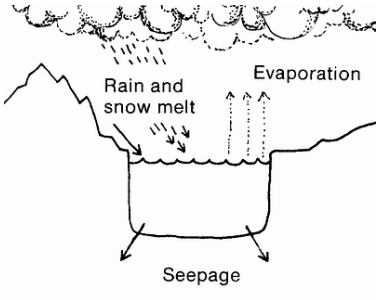
Introducing Crater Lake



Like No Place Else on Earth

Crater Lake has inspired its visitors for hundreds of years. No place else on earth combines such a deep, pure lake with sheer surrounding cliffs and a violent volcanic past. Few places on earth are so beautiful, so pristine, or - for these very reasons- so interesting to scientists and ordinary visitors alike.

Meet Crater Lake



Crater Lake is located in southern Oregon on the crest of the Cascade Mountain range and 100 miles (160 km) east of the Pacific Ocean. It lies inside a caldera, or volcanic basin, created when the 12,000 foot (3,660 meter) high Mount mazama collapsed 7,700 years ago following a large eruption.

Generous amounts of winter snow, averaging 528 inches (1,342 cm) per year, supply the lake with water. There are no inlets or outlets to the lake. Crater Lake, at 1,943 feet (592 meters) deep, is the deepest lake in the United States and one of the deepest lakes in the world. Evaporation and seepage prevent the lake from becoming any deeper.

The lake averages more than five miles (8 km) in diameter, and is surrounded by steep rock walls that rise up to 2000 feet (600 meters) above the lake's surface.

Following the collapse of Mount Mazama, lava poured into the caldera even as the lake began to fill. Today, a small volcanic island, Wizard Island, appears on the west side of the lake. This cinder cone rises 767 feet (234 meters) above the lake and is surrounded by black volcanic lava blocks. A small crater, 300 feet (90 meters) across and 90 feet (27 meters) deep, rests on the summit. The crater is filled by snow during the winter months, but remains dry during the summer.

Physical Characteristics

Color

The color of Crater Lake is the product of its great depth, the purity and clarity of its water, and the way solar radiation interacts with water. Water molecules absorb the longer wave lengths of light better (reds, oranges, yellows, and greens). This energy slowly heats the lake throughout the summer. Shorter wavelengths (blues) are more easily scattered than absorbed.

In the deep lake, some of the scattered light is redirected back up to the surface where we can see it. Around the edges where the water is less deep, some of the unabsorbed green sunlight is reflected back up. The color of the lake can vary from day to day depending on wind, cloud cover, and the angle of the sun.

Light Penetration
Sunlight is able to penetrate the waters of Crater Lake to great depths. Researchers often use a reflector called a Secchi disk to determine lake clarity. Readings deeper than 100 feet (30 meters) in most lakes are rare, but they can typically reach 120 feet (37 meters) at Crater lake. A reading of 142 feet (43.3 meters) was recorded in 1997.

Temperature
Surface temperatures of the lake water vary between 32°F (0°C) and 66°F (19°C) with summer temperatures typically between 50°F (10°C) and 60°F (16°C). Water more than 260 feet (80 meters) beneath the surface remains near 38°F (3°C) all year long. During the hottest time of the summer, the top water layers warm and become less dense than colder water below. This condition of thermal stratification usually continues into September.

The lake rarely freezes in winter because of the large amount of heat stored in the lake during the summer, windy surface conditions, and relatively mild air temperatures. The most significant complete freezing event in recent history occurred between January and April, 1949. The lake was mostly covered with ice twice in 1985, in January and again in December.

Why Is the Lake So Clear?

1) Most of the annual input comes directly for snow and rain.
2) No stream or creek flows into the lake carrying dissolved minerals or dust.
3) Seepage removes minerals already dissolved in the lake.
4) Volcanic rocks below the water line are relatively insoluble in cold lake water.

Water Circulation

The upper 600 feet (180 meters) of lake water appears to be well mixed based upon the degree of oxygen saturation. Studies indicate that some surface water mixes annually to the lake bottom but a total turnover of lake water is incomplete. As many as six years may be necessary to totally exchange lake water at the bottom with oxygen-rich surface water.

Hydrothermal Springs

Lake researchers have discovered two areas on the lake bottom affected by hydrothermal spring water. Mineral-rich water, at a slightly elevated temperature, pools in some locations and leave iron deposits in others. Communities of bacteria mark the venting sites.

Aquatic Life

Between 1888 and 1942, more than 1.8 million fish were introduced into Crater Lake. Today, rainbows trout and kokanee salmon can be seen swimming in the lake.

Scientists have identified 157 different species of phytoplankton and 12 species of zooplankton in the lake. The density and diversity of these minute life forms is greatly restricted by the low concentrations of nitrogen in the lake.

Large colonies of moss circle the lake at a dept between 100 feet (30 meters) and 400 feet (120 meters). The unusual clarity of the lake water permits the moss to thrive at depths found no where else.

Lake Statistics

Greatest Depth	1,943 feet (592 meters)
Average Depth	1,148 feet (350 meters)
Average Surface Elevation	6,173 feet (1,881 meters) above sea level
Shallowest Depth	15-25 feet (6 meters) at Phantom ship
	30-60 feet (14 meters) at Skell Channel
Surface Area	13,199 acres (5340 ha)
Widest Point	6.02 miles (9.69 km) Discovery Point - Grotto Cove
Narrowest Point	4.54 miles (7.31 km) Dutton Cliff-Llao Rock
Average Height of Rim	1,000 feet (300 meters) above the water
Highest Point on Rim	1,978 feet (603 meters) above the water at Hillman Peak
Lowest Point on Rim	507 feet (155 meters) above the water at Palisade Point
Wizard Island Elevation	767 feet (234 meters) above the lake surface
Phantom Ship	170 feet (52 meters) above the lake surface
Sinnott Memorial	900 feet (270 meters) above the lake surface
Rim Village to Wizard Island	2 miles (3 km)
Volume of Water	5 trillion gallons (19 trillion liters)